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RADIal versus femoral approach for percutaneous coronary interventions in patients with Acute Myocardial Infarction (RADIAMI): A prospective, randomized, single-center clinical trial

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Abstract

Background: *The transradial approach for percutaneous coronary intervention (PCI) seems to be superior to transfemoral. The safety and efficacy of transradial approach for PCI in acute myocardial infarction is not well-established.*

Methods: *Hundred patients with acute myocardial infarction qualified to PCI were randomly assigned to transradial (group I; n = 50) and transfemoral (group II; n = 50) approaches.*

Results: *PCI was successful for almost all patients, except one from group II. There were no significant differences between groups in X-ray exposition, volume of contrast and total procedure duration. Small but significant elongation of door to stent time in group I was caused mostly by a longer time between beginning of procedure and arterial sheath introduction. Major bleeding complications occurred in three patients from group I and seven from group II. There were no significant differences observed between the two groups. Time to ambulation in group I was significantly shorter then in group II (22.6 ± 10.3 h* vs. *34.7 ± 34.6 h; p = 0.003).*

Conclusions: *The transradial approach for PCI in acute myocardial infarction has the same efficacy as transfemoral. There are no differences in total procedure duration, X-ray exposition or volume of contrast between the two approaches. A longer time from the patient's admission to the individual stages of the PCI procedure in group I was mostly due to the longer times of the initial stages of the procedure. The use of transradial approach reduces the time to ambulation and allows rehabilitation to begin sooner. In both groups, bleeding complications occurred rarely.* (Cardiol J 2009; 16, 4: 332–340)

Key words: radial approach, percutaneous coronary intervention

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Introduction

Heart catheterization using the radial artery access site is a relatively new way of performing coronary angiography (CA) and interventional procedures in patients with stable and unstable coronary heart disease.

It was introduced to clinical practice in 1989 and is employed in a limited number of centers [1–7]. Most centers performing CA examinations and interventional procedures use the femoral artery access site. The transradial approach (TRA) ensures relatively high procedural effectiveness and a low risk of local complications, and permits a quick mobilization of the patient after the intervention [2, 8––12]. Furthermore, it decreases frequency of major bleeding complications which may correlate with lower mortality [13–17]. The vast majority of authors discussing TRA for CA and percutaneous coronary intervention (PCI) emphasize the relatively long training period necessary for the effective and safe performance of these procedures [11, 18, 19]. International literature provides some reports concerning the TRA for PCI in patients with myocardial infarction (MI) [12, 20–25]. The aim of our study was to compare the usefulness, effectiveness and procedural course of the TRA and transfemoral approaches (TFA) for PCI in patients with ST-elevation MI (STEMI), as well as to compare the effects during hospitalization.

Methods

The study protocol has been accepted by the Bioethics Committee. Patients included in the study fulfilled the following criteria:

— age between 18 and 75 years;
— presence of MI defined as retrosternal pain lasting longer than 20 minutes, but not longer than 12 hours, resistant to nitroglycerin, and accompanied by electrocardiography (ECG) changes: ST elevation of at least 1 mV in two neighboring leads or new left bundle branch block, found in the qualifying ECG examination performed in the admission room, in the referring hospital or in the emergency service;
— participation consent.

Criteria for exclusion were:

— age over 75 years;
— Killip class III or IV;
— necessity of an intra-aortic balloon pumping placement before the CA;
— necessity of an endocavitary stimulating electrode placement before the CA;
— height < 150 cm;
— history of coronary artery by pass grafting (CABG), if the infarction may be due to a closed venous or arterial bypass graft.

The age exclusion criterion (age > 75 years) is because substantially greater difficulties in accessing the radial artery can be expected

Qualification of patients

Our study included consecutive patients admitted to the center where the authors work. The patients were divided into two groups according to the treatment intention. Randomization was conducted in the admission room based on year of birth: group I included individuals born in even years and group II those born in odd years. All patients with a MI who fulfilled the inclusion criteria were registered. The study included those who fulfilled the inclusion criteria and did not fulfill the exclusion criteria. Group I included patients in whom the treatment intention was to perform heart catheterization using the TRA. Group II included patients in whom the treatment intention was to perform heart catheterization using the TFA. CA was preceded by the radial artery compression test. A pulse oximeter was used to establish an adequate collateral blood flow from the ulnar artery. In the case of an abnormal test result for the right upper limb, it was repeated on the left one. If the result was normal, the CA was performed using the left TRA. If the result was abnormal on both upper limbs, the procedure was performed with the TFA. For femoral artery puncturing, a 18 G needle and 0.035 inch wire were used, while for radial artery puncturing 21 G and 0.021 inch wire was used. Vascular sheaths size 6 F (Cordis, USA) were used for CA. For coronarography, standard catheters 6 F type Judkins and Amplatz (Asahi Intecc, Japan) were used. For PCI the following were used: 6 F guiding catheters Judkins, XB, Vista Brite Tip, JFL, JFR LBT (Cordis, USA) and Judkins, EBU Laucher (Medtronic, USA); guidewires Pilot 50,150 BMW (Guidant, USA); balloon dilatation catheters: Voyager (Abbott, USA), Maveric (Boston Scientific, USA), Crossale (Cordis, USA); stents mainly Driver and Micro-Driver (Medtronic, USA) and in some cases, Chopin (Balton, Poland). After puncturing the radial artery and introducing the sheath, verapamil was administered in the dose of 5 mg diluted in 5 mL of 0.9% NaCl. The dose was repeated in the case of a spasm, until reaching a total dose of 15 mg. Analgesia during the procedure was achieved by administering morphine in 2 mg doses, depending on the intensity of chest pain. Activated clotting time was checked in all patients after introducing the vascular sheath. Depend-

ing on activated clotting time result, additional doses of heparin (70 U/kg) were administered. Fibrinolytic drugs and platelet glycoprotein (GP) IIb/IIIa receptor blockers were administered during the intervention according to the operator's decision. In patients from group I, the vascular sheath was removed immediately after the procedure, and the radial artery was secured with a Terumo Band. Heparin administration was continued after the intervention only in the presence of clinical indications. Heart catheterization using TRA has been performed in our center since August 2004. The study was conducted by physicians with many years' experience of heart catheterization with TFA (300–400 PCI per year), who had performed at least 50–100 interventions using TRA.

Definitions

Thrombosis in Myocardial Infarction (PCI) was considered effective when a Thrombolysis In Myocardial Infarction (TIMI) grade 3 flow rate was obtained and residual stenosis was lower than 30%. Major bleeding complications included: fatal bleeding, bleeding requiring blood transfusion, operation or resulting in a drop of haemoglobin count of more than 3 g/dL as well as any intracranial haemorrhage. All other bleeding complications were considered minor. Serious cardiac events included a necessity of repeating the revascularization procedure in the infarct-related artery (IRA), a necessity of CABG, new MI occurrence and death from any cause. Total procedure time was defined as the period from the patient's arrival in the Cath Lab to the removal of the vascular sheath for group I, and to the removal of the catheter from the sheath for group II.

Statistical analysis

The obtained numeric data were presented as mean value ± standard deviation. Differences between the two groups were checked for significance with the two-tailed Student's *t*-test for independent variables, after checking the normality of data distribution with the Kolmogorov-Smirnov test and the equality of variances with the Fisher's F-test. Where the Student's *t*-test could not be employed (unequal variances, non-normal data distribution), groups were compared using the Mann-Whitney U test. Differences of relative frequencies were assessed based on the relative frequencies test.

Results

Patients were recruited for the study during the period April 2005 to June 2006. Of 181 consecutive patients with STEMI admitted to our center, 100 were included in the study (Fig. 1). Overall,

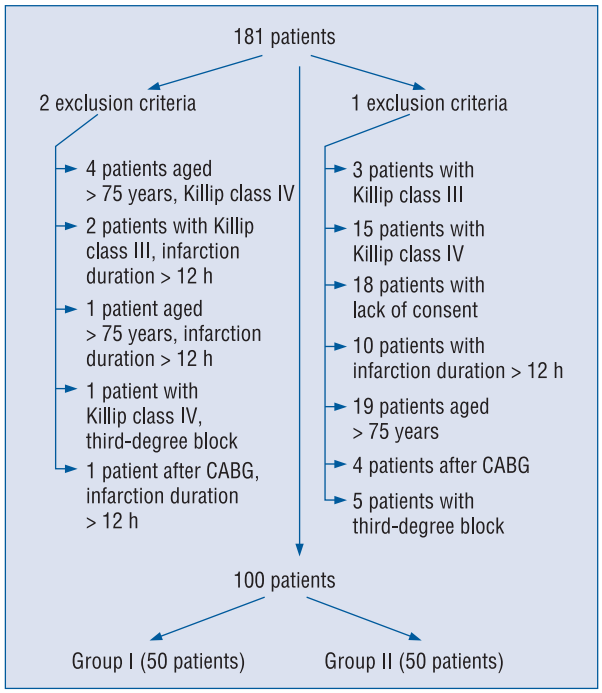

Figure 1. Flow chart of patients' in-hospital course; CABG — coronary artery bypass grafting.

55% of STEMI patients were recruited for the study. Table 1 presents the characteristics of investigated patients. There were no significant differences in demographic factors, cardiovascular status on admission, coronary heart disease risk factors or MI localization in ECG between the groups. All patients underwent primary PCI, and none had a fibrinolytic therapy or receptor IIb/IIIa inhibitor administered before hospital admission.

Course of the procedure

TFA was used in four patients in group I, three presenting an abnormal Allen test, and the other presenting an excessively tortuous radial artery course with a bilateral loop, preventing the passage of the catheter. One patient in group II underwent the intervention via TRA, due to atherosclerosis obliterans of the lower limbs. There was no difference in angiographic data (coronary heart disease advancement, IRA, TIMI flow grade of the IRA) between the groups (Table 2). PCI was attempted in all the patients. PCI was not completed in one patient from group II due to the impossibility of balloon passage through the occluded area of the artery. TIMI 3 flow was achieved in 88% of group I patients and 92% of group II patients. The effectiveness of heparin treatment was comparable in both groups. Mean activated clotting time was 287.1 s

Table 1. Basic clinical data of the patients.

	Entire study group (n = 100)	Group I (n = 50) (transradial)	Group II (n = 50) (transfemoral)	P
Mean age (years)	59.5 ± 9.1	59.9 ± 9.4	59.1 ± 9.0	NS
Height	169.1 ± 8,4	167.8 ± 7,5	169.5 ± 9.2	NS
Body weight	82.2 ± 14.7	79.5 ± 11.7	85.0 ± 16.8	NS
Men	68 (68%)	35 (51.5%)	33 (48.5%)	NS
Diabetes	15 (15%)	8 (16%)	7 (14%)	NS
Smoking	64 (64%)	34 (68%)	30 (60%)	NS
Arterial hypertension	47 (47%)	26 (52%)	21 (42%)	NS
Hyperlipidemia	19 (19%)	11 (22%)	8 (16%)	NS
Past infarction	11 (11%)	8 (16%)	3 (6%)	NS
Family history*	32 (32%)	16 (32%)	16 (32%)	NS
Killip class 1	99 (99%)	50 (100%)	49 (98%)	NS
Killip class 2	1 (1%)	0 (0%)	1 (2%)	NS
MIN until admission [min]	291 ± 282.6	247.7 ± 159.9	337.26 ± 362.4	NS**
HR at admission [beats/min]	78.2 ± 15.0	78.3 ± 13.7	78.2 ± 16.4	NS
SBP at admission [mm Hg]	135.2 ± 29.2	138.8 ± 33.2	131.6 ± 24.5	NS
DBP at admission [mm Hg]	78.4 ± 17.9	80.1 ± 18.6	76.7 ± 17.1	NS
Infarction localization:				
Anterior wall	42 (42%)	21 (42%)	21 (42%)	NS
Inferior wall	54 (54%)	27 (54%)	27 (54%)	NS
Left bundle branch block	0 (0%)	0 (0%)	0 (0%)	NS
Other	4 (4%)	1 (4%)	2 (4%)	NS

*Family history of coronary heart disease; **Mann-Whitney U test; MIN — mean infarction duration; DBP — diastolic blood pressure; SBP — systolic blood pressure; HR — heart rate

in both groups. Abciximab was administered to a similar percentage of patients in both groups (44% *vs*. 42%, groups I and II respectively). Stent placement was performed in all the patients who underwent PCI. There was no significant difference in the amount of contrast media used, or in X-ray exposure time between the groups.

Time intervals during percutaneous coronary intervention

There were differences in initial time intervals between the groups. The differences concerned the time between the patient's admission to hospital and his or her arrival in the Cath Lab. This time was longer in group I, but the difference was not statistically significant. Significant differences appeared for the following periods: from the admission to hospital to the positioning of the vascular sheath, to the first injection of contrast medium, to balloon positioning and to stent implantation. These periods were significantly longer in group I compared to group II, with the exception of the time to stent implantation, which was at the border of significance. The analysis of the intervals between the individual stages of the procedure demonstrated that the differences were mostly due to the significant difference in time from the arrival in the Cath Lab to vascular sheath positioning and from sheath positioning to the first contrast medium injection. These intervals were significantly longer in group I. The other intervals (injection–balloon, balloon–stent, stent–end of intervention) did not differ significantly, similarly to the total procedure time. Mean time interval from the end of intervention to vascular sheath removal from the femoral artery was 8.9 hours (Table 3).

Hospital observation

Mean time of patient mobilization (upright position) was significantly shorter in group I (20.18 ± ± 5.23 h) compared to group II (36.02 ± 33.55 h). Mean hospitalization time was 6.26 ± 3.86 days in group I *vs*. 6.75 ± 4.02 days in group II (p = 0.7727). One patient belonging to group II deceased during hospitalization due to left ventricular free wall rupture. No patient necessitated an emergency CABG. A repeated revascularization of the IRA had to be performed in three patients (one in group I and two in group II; one of the group I patients was diagnosed

Table 2. Angiography data.

	Entire study group (n = 100)	Group I (n = 50) (transradial)	Group II (n = 50) (transfemoral)	P
No. of pathologic vessels				
1	36 (37.5%)	21 (42.9%)	15 (31.9%)	NS
2	40 (41.7%)	19 (38.8%)	21 (44.7%)	NS
3	20 (20.8%)	9 (18.4%)	11 (23.4%)	NS
Infarct-related artery				
LM	0 (0%)	0 (0%)	0 (0%)	NS
LAD	43 (44.3%)	21 (42.9%)	22 (45.8%)	NS
Cx	12 (12.4%)	9 (18.4%)	3 (6.2%)	NS
RCA	42 (43.3%)	19 (38.8%)	23 (47.9%)	NS
Initial TIMI flow grade:				
0	53 (54.5%)	26 (53.1%)	27 (56.3%)	NS
1	9 (9.3%)	5 (10.2%)	4 (8.3%)	NS
2	19 (19.6%)	8 (16.3%)	11 (22.9%)	NS
3	16 (16.5%)	10 (20.4%)	6 (12.5%)	NS
Percutaneous coronary intervention	50 (100%)	50 (100%)	50 (100%)	NS
Final TIMI flow grade:				
0	1 (1%)	0 (0%)	1 (2%)	NS
1	0 (0%)	0 (0%)	0 (0%)	NS
2	9 (9%)	6 (12%)	3 (6%)	NS
3	90 (90%)	44 (88%)	46 (92%)	NS
Residual stenosis after the intervention (%)	1.7 ± 10.7	0.8 ± 4.0	2.6 ± 14.7	NS*
Mean max. ACT	287.1 ± 84.5	280.0 ± 94.5	294.4 ± 73.5	NS*
Abciximab	43 (43%)	22 (44%)	21 (42%)	NS
Exposure time [min]	11.1 ± 6.3	10.9 ± 5.6	11.2 ± 7.0	NS
Contrast amount [mL]	198.7 ± 45.7	198.7 ± 45.7	197.7 ± 72.0	NS*
No. of stents per patient	1.27 ± 0.47	1.28 ± 0.45	1.26 ± 0.49	NS
Stenting percentage	99 (99%)	50 (100%)	49 (98%)	NS

*Mann-Whitney U test; ACT — activated clotting time; LM — left mammary; LAD — left artery descending; Cx — circumflex artery; RCA — right coronary artery; TIMI — Thrombolysis In Myocardial Infarction

Table 3. Time intervals during coronary angiography and percutaneous coronary intervention.

Time from admission to (door to)	Entire study group (n = 100)	Group I (n = 50) (transradial)	Group II (n = 50) (transfemoral)	P
Arrival in the Cath Lab [min]	35.7 ± 21.6	37.8 ± 21.0	33.7 ± 22.2	NS
Sheath positioning [min]	49.1 ± 22.9	53.7 ± 21.9	44.4 ± 23.1	0.04
First contrast injection [min]	56.0 ± 25.1	62.3 ± 25.5	50.2 ± 23.8	0.02*
Balloon positioning [min] (door to balloon)	69.1 ± 27.9	76.9 ± 25.9	64.6 ± 26.9	0.02*
Stent implantation [min] (door to stent)	77.9 ± 27.2	83.2 ± 26.3	72.3 ± 27.3	0.05
End of intervention [min]	92.7 ± 28.7	98.7 ± 26.8	88.7 ± 30.1	0.17
Arrival in the Cath Lab–sheath positioning time [min]	13.6 ± 7.4	15.7 ± 7.8	11.4 ± 6.4	0.0028
Sheath–injection time [min]	6.6 ± 6.4	8.6 ± 7.8	4.5 ± 3.3	0.0008*
Injection–balloon time [min]	15.1 ± 7.9	15.6 ± 8.7	14.6 ± 7.1	NS
Balloon–stent time [min]	8.0 ± 4.9	7.3 ± 4.6	8.7 ± 5.2	0.21
Stent–end of intervention time [min]	14.4 ± 10.6	13.3 ± 8.6	15.5 ± 12.4	0.31
Procedure time [min]	56.8 ± 18.1	58.3 ± 17.8	55.1 ± 18.4	0.38
Time from the end of intervention to sheath removal [h]			8.9 ± 6.7	

*Mann-Whitney U test

Table 4. In-hospital course.

	Entire study group (n = 100)	Group I (n = 50) (transradial)	Group II (n = 50) (transfemoral)	P
Mortality	1 (1%)	0 (0%)	1 (2%)	NS
New infarction	1 (1%)	1 (2%)	0 (0%)	NS
Stroke	1 (1%)	0 (0%)	1 (2%)	NS
Composite death or myocardial infarction	2 (2%)	1 (2%)	1 (2%)	NS
Composite death or stroke	3 (3%)	1 (2%)	2 (4%)	NS
Repeated revascularization of the infarct-related artery	3 (3%)	1 (2%)	2 (4%)	NS
Aortocoronary by-pass grafting	0 (0%)	0 (0%)	0 (0%)	NS
Interventions on other arteries performed during hospitalization	6 (6%)	4 (8%)	2 (4%)	0.4
Major bleeding	10 (10%)	3 (6%)	7 (14%)	0.18
Fatal bleeding	0 (0%)	0 (0%)	0 (0%)	NS
Requiring transfusion	3 (3%)	0 (0%)	3 (6%)	0.08
Requiring operation	0 (0%)	0 (0%)	0 (0%)	NS
Drop in hemoglobin > 3 g/dL	7 (7%)	3 (6%)	4 (8%)	NS
Intracranial hemorrhage	0 (0%)	0 (0%)	0 (0%)	NS
Hematoma > 5 cm	13 (13%)	5 (10%)	8 (16%)	0.37

with a new myocardial infarction). Four patients in group I and two in group II underwent PCI of a different artery than the IRA during their hospitalization. Three patients in group II presented a major bleeding necessitating a transfusion (gastrointestinal hemorrhage in two cases, access site bleeding in the other). One patient in group II developed an ischemic stroke. There were no significant differences in hematocrit and hemoglobin values decrease and hematoma prevalence between the groups (Table 4).

Doppler examination

An ultrasonography examination of femoral and radial arteries was performed in all patients five days after the intervention. An asymptomatic radial artery occlusion was found in one patient in group I. This was related to a longer than usual compression with a pressure dressing, due to repeated bleeding. The ultrasonography examination found a hematoma in one patient in group I (2%) and six patients in group II (12%). No fistulas were found.

Discussion

Our study aimed to verify whether transradial catheterization in patients with MI was as efficient and safe as TFA. Literature data concerning this problem is scarce. The randomized TEMPURA study by Saito et al. [23] included 157 patients qualified for transradial or transfemoral PCI, in whom both access techniques were applicable. The TEMPURA study was conducted by investigators with a lot of experience of performing procedures employing the TRA. Patients with Killip class III and IV were also included in that study. No GP IIb/IIIa receptor inhibitors were used. The subsequent RADIAL-AMI study by Cantor et al. [26] included 50 patients with MI who underwent PCI with the TRA (25 patients) or the TFA (25 patients). Thrombolysis was used in 66% of patients and GP IIb/IIIa receptor inhibitors in 94%. That study also included patients in whom both access sites were possible. Patients with cardiogenic shock and those with contraindications to thrombolityc and/or GP IIb/IIIa receptor inhibitors therapy were excluded from the study. The study was conducted by operators who had performed 100 interventions using the TRA. Our study was conducted on a group of 100 patients randomly included in the trial; the intention-to-treat principle was applied. Abciximab was administered in 43% of cases. Abciximab administration depended on the operator's decision. The operator took into consideration both the existing contraindications for Abciximab administration and TIMI flow grade of the coronary artery in the initial angiography. Stents were implanted in all the patients, apart from one patient in group II in whom the intervention was ineffective. TIMI 3 flow rate in the IRA was

obtained in 88% and 92% of patients (group I and II respectively) and TIMI 2 flow rate in 12% and 6% (group I and II respectively). The corresponding procedure time was 58.3 min and 55.1 min, respectively. In the Saito et al. study [23], TIMI 3 flow rate was achieved in 96.1% and 97.2%, and TIMI 2 in 2.6% and 2.8% of patients (transradial and transfemoral group respectively); procedure time was 44 min and 51 min, respectively [23]. It should be stressed that both studies employed similar definitions of procedural effectiveness and procedure time. Our results are close to those obtained by Cantor et al. [26]: they achieved TIMI 2/3 in 9%/87% and 12%/ /88% of patients (transradial and transfemoral group respectively). They administered fibrynolytic drugs in all the patients and GP IIb/IIIa receptor blockers in a large part. X-ray exposure time in the present study was comparable to that of Cantor et al. [26].

The weakness of PCI from radial approach is that this procedure is considered to be technically more difficult and requires a longer time to master. In a case of myocardial infarction, it may prolong the time from admission to balloon inflation. There is a strong correlation between time from admission to balloon inflation and mortality rate. The longer the time, the higher the mortality rate [27, 28]. In our study it has been confirmed that the time from admission to balloon inflation was longer in group I than in group II and the difference was 12.3 m. However, no impact attributable to this difference on mortality rate in the investigated group was observed. It may be ascribed to the small number of patients and to the inclusion in this study of patients with low primary death risk.

Moveover our analysis showed that total procedure time were comparable in both groups. The observed differences in procedure times concerned its initial stages. The times from the patient's arrival in the Cath Lab to the puncture, and from puncture to first contract medium injection (first angiography) were significantly longer in group I, which is probably associated with less experience in employing the radial artery access site. However, extensive experience in the invasive treatment of MI permitted the operators to achieve a comparable total procedure time and X-ray exposure time, which was even shorter in group I. The administered amount of contrast media did not differ in both groups. Cantor et al. [26] obtained similar results. In their study, the delay in the procedure was mostly associated with the time difference from local anesthesia to the first contrast medium injection into the IRA. Several large non-interventional studies have established that performing examinations from a radial approach is correlated with a lower rate of major bleeding complications compared to performing the same examinations from a femoral approach [13–15].

A lower bleeding complications rate corresponds to lower mortality [16, 17]. Previous small randomized studies in patients with myocardial infarction showed fewer complications in interventions performed via the radial artery access site and no significant differences [12, 19, 24]. In the TEMPURA study, bleeding complications were observed only in the transfemoral group, but the difference was not statistically significant (3% *vs*. 0%, p = = 0.14). In that study no fibrynolytic or GP IIb/IIIa receptor blocking drugs were used. Cantor et al. [26] did not observe any major complications in the transradial and the transfemoral groups. In the present study, major bleeding complications occurred in both groups (6% *vs*. 14% transradial and transfemoral group respectively), but the difference was not statistically significant (p = 0.18). In the transradial group, major bleeding complications were associated only with drop of haemoglobin count of more than 3 g/dL; in the transfemoral group these complications included transfusion and haemoglobin count drop. No difference in in-hospital mortality was observed as there were no dissimilarities in bleeding complications. Major complications associated with artery puncturing are not more prevalent in the TFA than in TRA, as has been previously suggested. This has been confirmed by randomized studies, including the present work [23, 26].

It seems that a quick removal of the vascular sheath from the femoral artery, the use of small diameter sheaths, avoiding heparin administration after the procedure when not essential, and adequate heparinization during the procedure, mean that the prevalence of major complications is as small as in the TRA. The evaluation of other major complications in the study population did not yield statistically significant differences. One patient from group II died five days after the intervention due to left ventricular wall rupture, which raises the overall mortality rate to 1%. This is a low value; however, it should be noted that our study included patients with a relatively good prognosis. The PAMI study showed a mortality rate of 2.6% in patients with invasive treatment and without shock [29]. Stent placement reduced the prevalence of new MI and ischemia recurrence, as well as the necessity for a repeated intervention. In the FRESCO study, the prevalence of new MI was 1.3% and the prevalence of ischemia recurrence 3% [30]. In the present study new MI occurred only in one patient (1%),

and a repeated revascularization of the IRA was performed in three (3%) patients (group I: 2%, group II: 4%).

Our study demonstrates that patients who undergo transradial catheterization are more quickly rehabilitated and can faster assume the upright position. The difference in the upright position achievement time was almost 15.8 hours. Group I patients usually assumed the upright position during the first 24 hours (20.18 h), while group II patients usually did so only on the second day (36.02 h) after the procedure. Because most patients belonged initially to the low-risk group, a quick upright position achievement was possible. The difference in the upright position achievement time was due to the need for longer bed rest after the removal of the vascular sheath from the femoral artery and the placement of the dressing (a mean of 8.9 h after the end of the intervention). Nevertheless, earlier upright position achievement had no influence on the real time of hospitalization, because in our center multiple additional examinations (e.g. chest X-ray, echocardiography, 24-hour Holter monitoring) which are routinely performed on the fifth day of hospitalization in all MI patients, prolong the total hospitalization time.

Limitations of the study

The conclusions from a single center study cannot always be applied to other centers, as the results depend on the operators' experience. The present study included a small number of patients.

Conclusions

TRA for PCI in patients with MI is equally effective as TFA. Total procedure time, X-ray exposure time and the administered amount of contrast media did not differ in either group. The differences in the times between the patient's admission and the individual stages of the PCI procedure were mostly due to the longer intervals from the arrival in the Cath Lab to vascular sheath positioning and from sheath positioning to the first angiography in the transradial group. TRA in PCI procedures in patients with MI allows faster mobilization of the patient. Complications are rare in both groups.

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